Midterm Review, Function, For loops

Announcements
- Creative Assignment HW9
  Deadline extended
  Tuesday, Nov. 13th before class
- Will cover some stuff today and next Tuesday that might help you be more creative
- Midterm Thursday. Will cover all the material prior to today.

HW9: Creativity in Processing

Assignments: Write your programs to do whatever you want (but don’t copy the examples above), and try to make them clever or interesting or cute or have some property that would interest a viewer. You should try to use those you have learned in your former Processing homework, because those are the basics and one goal of this assignment is to practice the basics. But, if you need some other feature of Processing that you find in the reference page, go ahead and use it. The goal is creativity … but don’t spend forever on it either.

What will be on the midterm?

Programming
- LightBot
- Processing
  - Be able to read a Processing sketch and figure out what it does.
  - draw(), setup(), shape drawing functions, variables, if-else

Bits and Bytes
- Binary numbers
- Logic gates
- Transistors
- Representing data: pictures, text, numbers, documents
- Huffman Trees
- Cloud computing
- Meta data
- Steganography
- ???
Other

- Seven Big Ideas in Computing
- Blown to Bits – Ghosts in the machine
- LifeLogging
- Privacy in a digital world

The Seven Big Ideas in computing

- As defined by the College Board for new AP test
- Computing is a creative human activity that enables innovation
- Abstraction is a way to understand and solve problems
- Data and information help to create knowledge
- Algorithms are tools for developing and expressing solutions to computational problems
- Programming is a creative process that produces computational artifacts
- Digital devices, systems, and the networks that interconnect them enable and foster computational approaches to solving problems
- Computing enables innovation in other fields, like science, engineering, humanities, etc.

Functions, A Review

- Functions have been used in Lightbot 2.0: F1
- Functions were in Assignment 03: F.turn() ...
- We’ve used functions, also known as
  - procedures
  - methods
  - subroutines
in all of our Processing code: sized(200, 200)
- Recall that functions have two parts:
  - function definition ... a statement of how it works
  - function call ... a request to have it performed

Functions In Processing

- Form of function definition in Processing
  <return type> <name> <param list> { <body> }
as in
  void draw_a_box (int x_pos, int y_pos) {
    rect(x_pos, y_pos, 20, 20);
  }
  color pink () {
    return color(255, 200, 200);
  }

- Functions that do something, but do not return a value, have void as their <return type>
- Functions that return a value must say its type
  void draw_a_box (int x_pos, int y_pos) {
    rect(x_pos, y_pos, 20, 20);
  }
  color pink () {
    return color(255, 200, 200);
  }
Functions In Processing: Params

- Parameters are the values used as input to the function; parameters are not required, but the parentheses are.
- The type of each parameter must be given.

```java
void draw_a_box (int x_pos, int y_pos) {
  rect(x_pos, y_pos, 20, 20);
  color pink();
  return color(255, 200, 200);
}
```

Functions In Processing: Return

- A function returns its value with the `return` statement … the stuff following return is the result.
- The function is done when it reaches return.

```java
void draw_a_box (int x_pos, int y_pos) {
  rect(x_pos, y_pos, 20, 20);
  color pink();
  return color(255, 200, 200);
}
```

Writing Functions

- Processing function definitions are typically listed after the standard blocks: `setup()`, `draw()`, `mousePressed()`, etc.

Arguments Become Parameters

- Notice that if the DEFINITION has n parameters, the CALL needs n arguments.
- The parameters and arguments correspond.

```java
void draw() {
  rect(80, 40, 20, 40);
}
```

Parameters

- Parameters are automatically declared (and initialized) on a call, and remain in existence as long as the function remains unfinished.
- When the function ends, the parameters vanish, only to be recreated on the next call.
- It is wise to choose parameter names that help you remember exactly what they mean.
- I chose `xbase` as the orientation point of the figure in the x direction; I use that name a lot and I know what it means.